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PATENT APPLICATION

ATTORNEY DOCKET NO. 200207272-1

IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Wai Yuen HO

Confirmation No.: 8419

Application No.: 10/789,744

Examiner: Leonard S. Liang

Filing Date: February 27, 2004

Group Art Unit: 2853

Title: AN AUTOMATIC TRANSMISSION SYSTEM FOR A PRINTER CARRIAGE DRIVE

Mall Stop Appeal Brief-Patents
Commissioner For Patents
PO Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on Feb. 28, 2008.☒ The fee for filing this Appeal Brief is \$510.00 (37 CFR 41.20).☐ No Additional Fee Required.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d)) for the total number of months checked below:☐ 1st Month
\$120☐ 2nd Month
\$460☐ 3rd Month
\$1050☐ 4th Month
\$1840☐ The extension fee has already been filed in this application.☒ (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account 08-2025 the sum of \$ 510. At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16 through 1.21 inclusive, and any other sections in Title 37 of the Code of Federal Regulations that may regulate fees.

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MAIL STOP APPEAL BRIEF - PATENTS

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APPEAL BRIEF - PATENTS

Sir:

This is an Appeal Brief in connection with the decisions of the Examiner in a Final Office Action dated November 28, 2007. Each of the topics required in an Appeal Brief and a Table of Contents are presented herewith and labeled appropriately.

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(1) Real Party In Interest

The real party in interest is Hewlett-Packard Development Company, L.P.

(2) Related Appeals And Interferences

There are no other appeals or interferences related to this case.

(3) Status Of Claims

Claims 1, 3-7, and 9-14 are pending and rejected. Claims 2 and 8 have been cancelled. All pending claims 1, 3-7, and 9-14 are hereby appealed.

(4) Status of Amendments

No amendment was filed subsequent to the Final Office Action dated November 28, 2007.

(5) Summary Of Claimed Subject Matter

Claims 1, 7, and 14 of the present invention are the independent claims at issue in this appeal.

Claim 1

Claim 1 pertains to a carriage drive system including, inter alia, a variable speed drive motor (202, Figs. 2A and 2B) configured to propel a movable carriage along a slide rod.

Original claim 7; Specification, page 6, lines 10-17. The movable carriage supports print

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heads having an ink ejecting nozzle, and the variable speed drive motor is an electric motor (202, Figs. 2A and 2B) having a gear ratio resulting in a high carriage speed and a gear ratio resulting in a low carriage speed. *Original claim 7; Specification*, page 6, lines 10-17. The carriage drive system further includes a centrifugal clutch (216, Fig. 2B) operable to switch between the gear ratio resulting in a high carriage speed and the gear ratio resulting in a low carriage speed wherein the centrifugal clutch is an automatic two-way clutch. *Specification*, page 4, lines 20-24. Switching between the gear ratio resulting in the high carriage speed to the gear ratio resulting in a low carriage speed and switching between the gear ratio resulting in the low carriage speed to the gear ratio resulting in the high carriage speed both occur automatically based upon the operational speed of the drive motor. *Specification*, page 4, lines 20-24; page 6, lines 10-17.

Claim 7

Claim 7 pertains to a printer including a movable carriage supporting print heads having an ink ejecting nozzle and a slide rod for supporting and guiding the movable carriage. *Original claim 7*. The printer also includes a variable speed drive motor (202, Figs. 2A and 2B) configured to propel the movable carriage along the slide rod, wherein the variable speed drive motor is an electric motor. *Original claim 7; Specification*, page 6, lines 10-17. In addition, a gearing mechanism having a gear ratio resulting in a high carriage speed and a gear ratio resulting in a low carriage speed is provided. *Original claim 7; Specification*, page 6, lines 10-17. Furthermore, the printer includes a centrifugal clutch (216, Fig. 2B) operable to switch between the gear ratios wherein the centrifugal clutch is an automatic two-way clutch. *Specification*, page 4, lines 20-24. Switching between the gear

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ratio resulting in a high carriage speed to the gear ratio resulting in a low carriage speed and switching between the gear ratio resulting in a low carriage speed to the gear ratio resulting in a high carriage speed both occur automatically based upon the operational speed of the drive motor. *Specification*, page 4, lines 20-24; page 6, lines 10-17.

Claim 14

Claim 14 pertains to a method for printing, which will be explained with reference to Fig. 3 and includes activating a variable speed drive motor (202, Figs. 2A and 2B) to propel a movable carriage along a slide rod, wherein the movable carriage supports print heads having an ink ejecting nozzle and, wherein the variable speed drive motor is an electric motor having a gear ratio resulting in a high carriage speed and a gear ratio resulting in a low carriage speed. *Fig. 3, 310; Original claim 7; Specification*, page 6, lines 10-17. The method further includes switching between the gear ratio resulting in a high carriage speed and the gear ratio resulting in a low carriage speed. *Fig. 3, 320; Specification*, page 4, lines 20-24. Switching between the gear ratio resulting in a high carriage speed to the gear ratio resulting in a low carriage speed and switching between the gear ratio resulting in the low carriage speed to the gear ratio resulting in the high carriage speed both occur automatically by means actuated by the operational speed of the drive motor. *Fig. 3, 320; Specification*, page 4, lines 20-24; page 6, lines 10-17.

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(6) Grounds of Rejection to be Reviewed on Appeal

a) Whether claims 1, 7, and 14 were properly rejected under 35 U.S.C. §103(n) as being unpatentable over Ito et al. (U.S. Patent No. 5,097,189) in view of Floyd (U.S. Patent No. 3,071,018).

b) Whether claims 3-6 and 9-13 were properly rejected under 35 U.S.C. §103(a) as being unpatentable over Ito et al. in view of Floyd, as applied by the Examiner to claims 1, 7, and 14, and further in view of Youngren et al. (U.S. Patent No. 2,699,076).

(7) Arguments

A. Reversal of the rejection of claims 1, 7, and 14 under 35 U.S.C. §103(a) as being unpatentable over Ito et al. in view of Floyd is respectfully requested.

The test for determining if a claim is rendered obvious by one or more references for purposes of a rejection under 35 U.S.C. § 103 is set forth in *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, 82 USPQ2d 1385 (2007):

"Under §103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented." Quoting *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966).

As set forth in MPEP 2143.03, to ascertain the differences between the prior art and the claims at issue, "[a]ll claim limitations must be considered" because "all words in a claim

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must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385. According to the Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in view of *KSR International Co. v. Teleflex Inc.*, Federal Register, Vol. 72, No. 195, 57526, 57529 (October 10, 2007), once the *Graham* factual inquiries are resolved, there must be a determination of whether the claimed invention would have been obvious to one of ordinary skill in the art based on any one of the following proper rationales:

(A) Combining prior art elements according to known methods to yield predictable results; (B) Simple substitution of one known element for another to obtain predictable results; (C) Use of known technique to improve similar devices (methods, or products) in the same way; (D) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results; (E) "Obvious to try"—choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; (F) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to one of ordinary skill in the art; (G) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention. *KSR International Co. v. Teleflex Inc.*, 550 U.S., 82 USPQ2d 1385 (2007).

Furthermore, as set forth in *KSR International Co. v. Teleflex Inc.*, quoting from *In re Kahn*, 441 F.3d 977, 988 (CA Fed. 2006), "[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasonings with some rational underpinning to support the legal conclusion of obviousness."

Therefore, if the above-identified criteria and rationales are not met, then the cited reference(s) fails to render obvious the claimed invention and, thus, the claimed invention is distinguishable over the cited reference(s).

Claim 1 recites a carriage drive system, comprising, *inter alia*, a centrifugal clutch operable to switch between the gear ratio resulting in a high carriage speed and the gear ratio

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resulting in a low carriage speed wherein the centrifugal clutch is an automatic two-way clutch, such that switching between the gear ratio resulting in the high carriage speed to the gear ratio resulting in a low carriage speed and switching between the gear ratio resulting in the low carriage speed to the gear ratio resulting in the high carriage speed both occur automatically based upon the operational speed of the drive motor.

Both Ito et al. and Floyd, taken alone or in combination, *fail* to teach or suggest at least these features. Ito et al. is drawn to a recording apparatus in which a standard stepping motor is used as a driving source to reciprocate a carriage. Abstract of Ito et al.

The Examiner in the Final Office Action at page 3 *concedes* that Ito et al. *fails* to teach or suggest the recited feature that switching between the gear ratio resulting in the high carriage speed to the gear ratio resulting in a low carriage speed and switching between the gear ratio resulting in the low carriage speed to the gear ratio resulting in the high carriage speed both occur automatically based upon the operational speed of the drive motor.

The Examiner in the Final Office Action at page 4 states that Floyd discloses a mechanical drive mechanism comprising a two-way clutch and that it would have been obvious to a person of ordinary skill in the art at the time the invention was made to replace "the speed controlling carriage driving motor of Ito et al (which uses energized coils as opposed to gears) with a speed controlling carriage driving motor comprising the alleged two-way clutch mechanism of Floyd."

Appellant respectfully *disagrees* for the following two reasons.

First, even if the recording device of Ito et al were combined with the mechanical drive mechanism of Floyd as suggested in the Final Office Action, the combination would not have shown all of the claimed elements. The recited feature that switching between the

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gear ratio resulting in the high carriage speed to the gear ratio resulting in a low carriage speed and switching between the gear ratio resulting in the low carriage speed to the gear ratio resulting in the high carriage speed both occur automatically based upon the operational speed of the drive motor is missing in the suggested combination.

Floyd *fails* to disclose or fairly suggest any mechanism for the recited feature that switching between the gear ratio resulting in the high carriage speed to the gear ratio resulting in a low carriage speed and switching between the gear ratio resulting in the low carriage speed to the gear ratio resulting in the high carriage speed both occur automatically based upon the operational speed of the drive motor.

For example, Floyd discloses a control shaft 80 in Fig. 1 connected to a lever means 99 in the same figure. The axes of rotation for balls 10 and 11 in Fig. 2 can be changed through the use of the lever means 98 and 99 as shown in Figs. 5-10. As the axes of rotation of the balls 10 and 11 change by turning the lever means 98-99 as shown in Figs. 5-10, output speeds change directly proportionally to the angle of rotation of the control shaft 80, which angle in turn changes by turning the lever means 98 and 99. Specification of Floyd, column 5, lines 53-65; column 5, line 72, to column 6, line 27. While Floyd does mention automatic rotation of shaft 80 (column 5, lines 28-33), Floyd *fails* to disclose or fairly teach any means for making the rotation of shaft 80 other than manually, especially one adapted for being combined with the printing device of Ito et al.

Ito et al. *fails* to address the above discussed deficiency of Floyd.

Second, Ito et al. and Floyd are *not combinable* with each other as suggested in the Final Office Action. Ito et al.'s printing device is designed so that the motor speed control circuit 24 in Fig. 3 of Ito et al. is to close-loop control the rotational speed of the motor 6

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(same figure) to thereby control "the rotational speed of the motor 6 to the speed in the high or low speed mode." Specification of Ito et al., column 4, lines 53-68. Further, Ito et al. discloses that the "time which is required from the start of the carriage until the arrival at a constant speed running (rotational speed: 800 r.p.m.) in the high speed mode is set to about 60 msec. . . and the time which is required from the constant speed run until the stop of the carriage is set to about 60 msec." Column 4, lines 6-17. Such close-loop control of the rotational speed of the motor 6 to the speed in the high or low speed mode and the required stop and start time of Ito et al. *cannot be achieved* using the mechanical drive mechanism of Floyd, which requires a shut-down and a start-up of the input shaft 1 in Fig. 1 "whenever the speed control shaft is changed." Specification of Floyd, column 10, lines 22-27. Thus, Ito et al. and Floyd are *not combinable* with each other as suggested in the Final Office Action.

Further, Ito et al. *teaches away* from using the mechanical drive mechanism of Floyd for the same reasons discussed above.

Ito et al. *fails* to teach or fairly suggest any ways to overcome the above discussed deficiency of Floyd.

For at least the above reasons, it is respectfully requested that the rejection of claims 7 and 14 under 35 U.S.C. §103(a) as being unpatentable over Ito et al. in view of Floyd be reversed.

Claims 7 and 14 recite features similar to those features of claim 1 discussed above. Thus, it is respectfully submitted that for the reasons set forth earlier with respect to independent claim 1, that the rejection of claims 7 and 14 under 35 U.S.C. §103(a) as being unpatentable over Ito et al. in view of Floyd be reversed.

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B. Reversal of the rejection of claims 3-6 and 9-13 under 35 U.S.C. §103(a) as being unpatentable over Ito et al. in view of Floyd, as applied by the Examiner to claims 1, 7, and 14, and further in view of Youngren et al. is respectfully requested.

Claims 3-6 and 9-13 are respectively dependent upon claims 1 and 7.

With respect to claims 3-6 and 9-13, the Examiner applies Ito et al. and Floyd in the same way they were applied with respect to claims 1 and 7. Thus, for the reasons set forth earlier with respect to independent claims 1 and 7, the proposed combination of Ito et al. and Floyd *fails* to teach or fairly suggest a carriage drive system comprising, *inter alia*, a centrifugal clutch operable to switch between the gear ratio resulting in a high carriage speed and the gear ratio resulting in a low carriage speed wherein the centrifugal clutch is an automatic two-way clutch, such that switching between the gear ratio resulting in the high carriage speed to the gear ratio resulting in a low carriage speed and switching between the gear ratio resulting in the low carriage speed to the gear ratio resulting in the high carriage speed both occur automatically based upon the operational speed of the drive motor.

The Examiner in the Final Office Action relies on Youngren et al. to show additional features recited in claims 3-6 and 9-13. However, the proposed combination of Ito et al., Floyd and Youngren as suggested in the Final Office Action *fails* for the problems discussed above with respect to the combination of Ito et al. and Floyd.

For at least the above reasons, it is respectfully requested that the rejection of claims 3-6 and 9-13 under 35 U.S.C. §103(a) as being unpatentable over Ito et al. in view of Floyd, as applied by the Examiner to claims 1, 7, and 14, and further in view of Youngren et al. be reversed.

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Accordingly, it is respectfully submitted that the Final Office Action *failed* to establish a *prima facie* case of obviousness against claims 1, 3-7, and 9-14. Therefore, reversal of the rejection of these claims and their allowance are respectfully requested.

(8) Conclusion

For at least the reasons given above, the rejections of claims 1, 3-7, and 9-14 are improper. Accordingly, it is respectfully requested that such rejections by the Examiner be reversed and these claims be allowed. Attached below for the Board's convenience is an Appendix of claims 1, 3-7, and 9-14 as currently pending.

Please grant any required extensions of time and charge any fees due in connection with this Appeal Brief to deposit account no. 08-2025.

Respectfully submitted,

Dated: April 28, 2008

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(9) Claim Appendix**1. (Previously Presented) A carriage drive system, comprising:**

a variable speed drive motor configured to propel a movable carriage along a slide rod, wherein the movable carriage supports print heads having an ink ejecting nozzle, and wherein the variable speed drive motor is an electric motor having a gear ratio resulting in a high carriage speed and a gear ratio resulting in a low carriage speed; and

a centrifugal clutch operable to switch between the gear ratio resulting in a high carriage speed and the gear ratio resulting in a low carriage speed wherein the centrifugal clutch is an automatic two-way clutch, such that switching between the gear ratio resulting in the high carriage speed to the gear ratio resulting in a low carriage speed and switching between the gear ratio resulting in the low carriage speed to the gear ratio resulting in the high carriage speed both occur automatically based upon the operational speed of the drive motor.

3. (Original) A carriage drive system according to claim 1, wherein the gearing mechanism is a planetary gear assembly having:

a sun gear driven by the drive motor;

a ring gear; and

a plurality of planet gears associated with a planet carrier.

4. (Previously Presented) A carriage drive system according to claim 3, wherein operation of the drive motor at a high speed causes the centrifugal clutch to engage the ring gear

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causing the planet gears and the drive gear to be locked together such that they rotate as one with the sun gear resulting in a 1:1 gear ratio and operation of the drive motor at a low speed causes the mechanism for switching between gear ratios to disengage the ring gear causing the sun gear to turn the planet gears which turn the ring gear resulting in a gear ratio greater than 1:1.

5. (Original) A carriage drive system according to claim 3, further comprising a speed calibration member for adjusting the gear ratio between the drive motor and the ring gear.

6. (Original) A carriage drive system according to claim 5, wherein the gear ratio between the drive motor and the ring gear is proportional to a friction force between the planet carrier and the speed calibration member.

7. (Previously Presented) A printer, comprising:

a movable carriage supporting print heads having an ink ejecting nozzle;

a slide rod for supporting and guiding the movable carriage;

a variable speed drive motor configured to propel the movable carriage along the slide rod, wherein the variable speed drive motor is an electric motor;

a gearing mechanism having a gear ratio resulting in a high carriage speed and a gear ratio resulting in a low carriage speed; and

a centrifugal clutch operable to switch between the gear ratios wherein the centrifugal clutch is an automatic two-way clutch, such that switching between the gear ratio resulting in a high carriage speed to the gear ratio resulting in a low carriage speed and switching

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between the gear ratio resulting in a low carriage speed to the gear ratio resulting in a high carriage speed both occur automatically based upon the operational speed of the drive motor.

9. (Original) A printer according to claim 7, wherein the gearing mechanism is a planetary gear assembly having:

- a sun gear driven by the drive motor;
- a ring gear; and
- a plurality of planet gears associated with a planet carrier.

10. (Previously Presented) A printer according to claim 9, wherein operation of the drive motor at a high speed causes the centrifugal clutch to engage the ring gear causing the planet gears and the drive gear to be locked together such that they rotate as one with the sun gear resulting in a 1:1 gear ratio and operation of the drive motor at a low speed causes the centrifugal clutch to disengage the ring gear causing the sun gear to turn the planet gears which turn the ring gear resulting in a gear ratio greater than 1:1.

11. (Original) A printer according to claim 9, further comprising a speed calibration member for adjusting the gear ratio between the drive motor and the ring gear.

12. (Original) A printer according to claim 11, wherein the gear ratio between the drive motor and the ring gear is proportional to a friction force between the planet carrier and the speed calibration member.

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13. (Original) A printer according to claim 12, wherein the speed calibration member is manually adjustable.

14. (Previously Presented) A method for printing, comprising:

activating a variable speed drive motor to propel a movable carriage along a slide rod, wherein the movable carriage supports print heads having an ink ejecting nozzle and, wherein the variable speed drive motor is an electric motor having a gear ratio resulting in a high carriage speed and a gear ratio resulting in a low carriage speed;

switching between the gear ratio resulting in a high carriage speed and the gear ratio resulting in a low carriage speed;

wherein switching between the gear ratio resulting in a high carriage speed to the gear ratio resulting in a low carriage speed and switching between the gear ratio resulting in the low carriage speed to the gear ratio resulting in the high carriage speed both occur automatically by means actuated by the operational speed of the drive motor.

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(10) Evidence Appendix

None.

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(11) Related Proceedings Appendix

None.